MICHIGAN DEPARTMENT OF NATURAL RESOURCES
Wildlife Division Report No. 3466
February 2007

Printed by Authority of: P.A. 451 of 1994
Total Number of Copies Printed: 15
Cost per Copy:.....$1.89
Total Cost: $28.35

Michigan Department of Natural Resources

2005 WATERFOWL HARVEST SURVEY

Brian J. Frawley

ABSTRACT

A sample of people eligible to hunt waterfowl was contacted after the 2005 hunting seasons to estimate hunting activity and determine opinions and satisfaction with hunting regulations. In 2005, about 50,400 people hunted waterfowl. The number of people hunting ducks and geese declined 15% and 14%, respectively, between 2004 and 2005, although license sales declined by only 5%. Compared to 2004, an increased proportion of duck hunters in 2005 were satisfied with the number of ducks seen (38 versus 33% satisfied). Goose hunters reported increased satisfaction with the number of geese seen (54 versus 48% satisfied) and with their overall goose hunting experience (49 versus 43%). Most duck hunters that preferred to hunt in the North Zone (66%) favored a duck hunting season beginning in the latter half of September. Among hunters that preferred to hunt in the Middle Zone in 2005, 56% preferred a season beginning during late September or early October. For the duck hunters that preferred to hunt in the South Zone in 2005, the most frequently selected preferred start dates (56%) for the season were early to mid-October. The proportion of duck hunters that normally used spinning-wing decoys increased from 13 to 24% between 2001 and 2005. As these decoys have become more popular, the proportion of duck hunters disapproving of their use has declined. Goose hunters were asked their opinion on the use of various hunting practices which are currently illegal to help control goose numbers. Most goose hunters approved of hunting with unplugged guns, extending the hunting season to include late August, and hunting geese until 30 minutes after sunset. Goose hunters also were asked their opinion on the use of various techniques to control goose numbers in areas where human-goose conflict was a problem and hunting was not possible. In these situations, most goose hunters (≥57%) have consistently supported killing adult geese and donating the meat to families in need. Most goose hunters (≥64%) have consistently disapproved of controlling

A contribution of Federal Aid in Wildlife Restoration, Michigan Project W-147-R

IC 2578-104 (02/22/2007)

goose populations using dietary supplements that would reduce their reproduction.

INTRODUCTION

The Natural Resources Commission and Michigan Department of Natural Resources (DNR) have the authority and responsibility to protect and manage the wildlife resources of the state of Michigan. This responsibility is shared with the U.S. Fish and Wildlife Service (USFWS) for the management of migratory species such as ducks (Anatinae) and geese (*Branta* and *Anser* spp.). Harvest surveys are one of the management tools used by the Wildlife Division in formulating proposed regulations. Estimating harvest and hunting effort are among the primary objectives of these surveys. Estimates derived from harvest surveys, as well as breeding bird counts and population modeling, are used to monitor game populations and establish harvest regulations.

Waterfowl could be harvested during hunting seasons that occurred between September 1, 2005, through January 29, 2006, (Table 1) by a person possessing both a waterfowl and a small game hunting license (includes resident, nonresident, 3-day nonresident, resident junior, and senior small game hunting licenses). Waterfowl hunters also had to obtain a federal waterfowl stamp and to register with the National Migratory Bird Harvest Information Program (HIP). Hunters younger than 16 years of age could hunt waterfowl without a waterfowl hunting license or a federal waterfowl stamp; however, they still were required to purchase a small game license and register with the HIP.

The HIP is a cooperative effort between state wildlife agencies and the USFWS. It was implemented to improve knowledge about harvest of migratory game birds (e.g., ducks, geese, and woodcock [*Scolopax minor*]). Beginning in 1995, any person who hunted migratory game birds in Michigan was required to register with the HIP and answer several questions about their hunting experience during the previous year. The HIP provided the USFWS with a national registry of migratory bird hunters from which they can select participants for harvest surveys.

The USFWS sets overall hunting season frameworks (i.e., number of days of hunting and bag limits) for migratory birds, but state wildlife agencies select specific regulations such as season dates within those frameworks. Both waterfowl population status and hunter attitudes are used when developing waterfowl hunting regulations. Although estimating harvest, hunter numbers, and hunting effort were the primary objectives of the waterfowl harvest survey, this survey also provided an opportunity to collect information about management issues. Questions were added to the questionnaire to estimate hunters' opinions and satisfaction with hunting regulations and waterfowl numbers.

METHODS

Following the 2005 hunting seasons, a questionnaire was sent to 5,991 randomly selected people. The people selected were grouped into one of two strata on the basis of their age, licenses purchased, and whether they had registered with the HIP. The first stratum consisted of people at least 16 years old that had purchased a waterfowl hunting license.

The second stratum consisted of people less than 16 years old that had registered with the HIP. The sample consisted of 4,972 people from the first stratum (N=59,579) and 1,019 people from the second stratum (N=12,095).

Questionnaires were mailed initially in late April. Up to two follow-up questionnaires were sent to non-respondents. Questionnaires were undeliverable to 101 people, primarily because of changes in residence. Questionnaires were returned by 3,473 of 5,890 people receiving the questionnaire (59% response rate).

Estimates were calculated using a stratified random sampling design (Cochran 1977). Using stratification, hunters were placed into similar groups (strata) based on their age, licenses purchased, and whether they had registered with the HIP, and then estimates were derived for each group separately. The statewide estimate was then derived by combining group estimates so the influence of each group matched the frequency its members occurred in the statewide population of hunters. The primary reason for using a stratified sampling design was to produce more precise estimates. Improved precision means similar estimates should be obtained if this survey were to be repeated.

Estimates were derived separately for the Upper Peninsula (UP), northern Lower Peninsula (NLP), and southern Lower Peninsula (SLP)(Figure 1). For duck hunting, estimates were also calculated for each management zone. Hunting effort and birds harvested from unknown locations were allocated among areas in proportion to the known effort and harvest. Estimates were calculated along with their 95% confidence limit (CL). In theory, this confidence limit can be added and subtracted from the estimate to calculate the 95% confidence interval. The confidence interval is a measure of the precision associated with the estimate and implies the true value would be within this interval 95 times out of 100. Unfortunately, there are several other possible sources of error in surveys that are probably more serious than theoretical calculations of sampling error. They include failure of participants to provide answers (nonresponse bias), question wording, and question order. It is difficult to measure these biases. Thus, estimates were not adjusted for possible bias. Furthermore, harvest estimates did not include animals taken legally outside the open season (e.g., nuisance animals).

Statistical tests are used routinely to determine the likelihood the differences among estimates are larger than expected by chance alone. The overlap of 95% confidence intervals was used to determine whether estimates differed. Non-overlapping 95% confidence intervals was equivalent to stating the difference between the means was larger than would be expected 995 out of 1,000 times, if the study had been repeated (Payton et al. 2003).

RESULTS

License sales and hunter participation

In 2005, 59,658 people purchased a waterfowl hunting license (Table 2). The average age of people that purchased a waterfowl hunting license was 42 years (Figure 2). About 2% (897) of waterfowl license buyers were younger than 17 years old, although hunters 12-15 years of

age could legally hunt waterfowl without a waterfowl hunting license. About 98% of the waterfowl hunting license buyers were males.

An estimated 50,426 people actually hunted waterfowl in 2005 (Table 3). About 70 ± 1% of the people eligible to hunt waterfowl actually spent time hunting ducks or geese (Tables 3 and 4). About 76 ± 1% of the people that were at least 16 years old that had purchased a waterfowl hunting license (stratum 1) actually hunted. In contrast, 41 ± 4% of the people less than 16 years old that had registered with the HIP (stratum 2) hunted waterfowl. About 38 ± 2% (26,956 ± 1,111) of those eligible to hunt waterfowl attempted hunting both ducks and geese. An estimated 42,660 duck hunters spent 339,741 days afield, while an estimated 34,726 goose hunters spent 255,938 days afield (Tables 4-5). The amount of effort spent hunting ducks declined 16% between 2004 and 2005. The number of people hunting ducks and geese declined 15% and 14%, respectively, between 2004 and 2005. Waterfowl hunters harvested 384,819 ducks and 193,836 geese (Table 6).

Most duck hunters (71%) hunted in the South Zone, while 28% hunted in the Middle Zone and 16% hunted in the North Zone (Table 7). Most duck hunters (57 $\pm$ 2%) preferred to hunt in the South Zone, while 31 $\pm$ 1% preferred the Middle Zone and 12 $\pm$ 1% preferred the North Zone.

About 19 $\pm$ 2% of waterfowl hunters hunted on Managed Waterfowl Hunt Areas in 2005 (Table 8). The Managed Waterfowl Hunt Areas (MWHA) consisted of Allegan Highbanks, Fennville Farm, Fish Point, Muskegon County Wastewater, Nayanquing Point, Pointe Mouillee, Shiawassee Federal Refuge, Shiawassee State Game Area, and St. Clair Flats (Harsens Island). About 20 $\pm$ 2% of the hunters that hunted ducks hunted on MWHAs, while 14 $\pm$ 2% of active goose hunters had hunted geese on MWHA.

Harvest and hunting trends

Annual comparisons of season segments are difficult to interpret because lengths of hunting season segments often change annually and hunting zones and stratification zones do not coincide (Figure 1). The combined totals from all segments of the season are more appropriate for annual comparisons. Compared to 2004, fewer people hunted ducks statewide for all seasons combined, and they hunted fewer days (Tables 4-6). In addition, the number of people hunting geese declined statewide between 2004 and 2005 for all seasons combined; however, their hunting effort and harvest was not significantly different between years.

Hunter opinions

An estimated 50% of the Michigan duck hunters were satisfied with their duck hunting experience in 2005, 19% had a neutral opinion about their experience, while 23% of duck hunters were dissatisfied (Table 9). Satisfaction among goose hunters with the goose hunting seasons was similar to the satisfaction levels reported for duck hunting.

Nearly 50% of Michigan duck hunters were satisfied with the 2005 duck hunting season dates, length of the duck season, and the daily duck limit (Table 9). However, nearly 50% of the duck hunters reported they were dissatisfied with the number of ducks harvested in 2005.

About 41% of goose hunters were dissatisfied with the number of geese harvested in 2005, but unlike duck hunters, nearly 50% of goose hunters were satisfied with the number of geese seen.

Many duck hunters (52 ± 2%) did not use motorized spinning-wing decoys while hunting in 2005. About 23 ± 2% of the duck hunters occasionally used a motorized spinning-wing decoy, 14 ± 1% usually used these decoys, and 10 ± 1% of the duck hunters always hunted with these decoys. About 1 ± 1% of the duck hunters did not provide an answer. Most duck hunters (60 ± 2%) approved of hunters using motorized spinning-wing decoys (23 ± 2% of the duck hunters strongly approved, and 38 ± 2% approved of these decoys). However, 17 ± 1% of the duck hunters disapproved of hunters using these decoys (10 ± 1% strongly disapproved and 8 ± 1% disapproved). About 22 ± 2% of the duck hunters had no opinion. Less than 1% of the duck hunters did not provide an answer. Most duck hunters (57 ± 2%) did not approve of a ban of motorized spinning-wing decoys. In contrast, 26 ± 2% of the duck hunters approved of a ban of motorized spinning-wing decoys. Among the hunters favoring a ban, 9 ± 1% approved of this ban only if it was enacted in all states, while 9 ± 1% of the hunters approved of the ban even if the ban did not include other states. In addition, a small proportion of duck hunters favored a ban if the ban was restricted to public lands (1%), restricted to managed waterfowl hunt areas (1%), or limited to only a part of the season (3%).

Duck hunters were presented four options representing the major views that hunters had about hunting with spinning-wing decoys and were asked to select the option that best described their view. The four options included: (1) the use of spinning-wing decoys should never be restricted, (2) spinning-wing decoys should be banned because they are unethical, (3) spinning-wing decoys should be regulated only if their use results in declining duck numbers and shorter hunting seasons, and (4) not sure. The most frequently selected choice was that spinning-wing decoys should be regulated only if they cause duck numbers to decline and hunting seasons are shortened; 38 ± 2% of the hunters favored this option. About 31 ± 2% of the hunters never wanted to restrict the use of spinning-wing decoys, but 12 ± 1% wanted to ban spinning-wing decoys for ethical reasons. About 18 ± 2% of the duck hunters were not sure or did not provide an answer.

When asked about future duck hunting season start dates, 37% of duck hunters that preferred to hunt in the North Zone favored a hunting season beginning September 30, and 29% preferred a September 23 start (Figure 3). Among hunters that preferred to hunt in the Middle Zone, 30% of these duck hunters preferred a season beginning on October 1, while 26% preferred to start hunting on September 30. For the hunters that preferred to hunt in the South Zone, the most frequently selected start dates for the season were early to mid-October.

In some residential areas where hunting has not been an option for controlling nuisance urban geese, goose nests have been destroyed. These nesting geese have not produced young, and they have often flown to Hudson Bay for the summer and then returned to Michigan during the hunting season. Hunters were asked whether they agreed with this practice of destroying goose nests. About 38 ± 2% of the goose hunters approved of destroying goose nests (Figure 4). Within this group, 12 ± 2% of the hunters strongly approved of the practice and 25 ± 2% approved of the technique. About 40 ± 2% of the

goose hunters either strongly disapproved or disapproved of the nest destruction. About 22 ± 2% of the goose hunters were not sure about this method for controlling goose numbers or did not provide an answer.

Hunters were asked their opinion on the use of various techniques to control goose numbers in areas where human-goose conflict was a problem and hunting was not possible. In these situations, most (57 ± 2%) goose hunters supported killing adult geese and donating the meat to families in need as an option for reducing goose numbers. In contrast, most (65 ± 2%) goose hunters did not support controlling goose populations using dietary supplements that would reduce reproduction.

Goose hunters were presented six options for handling geese in areas where hunting has not been effective in controlling conflicts between geese and people, and they were asked to rank these options from most preferred (assigned a value of one) to least preferred (a value of seven). The six options included: (1) kill problem geese and process for human consumption, (2) kill problem geese and bury the carcasses, (3) move geese from problem sites to other areas in Michigan, (4) destroy nests and eggs of geese in problem areas, (5) feed problem geese food supplements that prevent goose eggs from hatching, and (6) let the Federal government decide how to handle problems with geese. In addition to these six options, respondents could specify another option for controlling geese and also rank this option. The most preferred options among goose hunters were killing the geese and processing them for human food or relocating geese from problems areas (Figure 4). The next most popular options were destroying geese nests or feeding dietary supplements to reduce goose reproduction. The least preferred options among goose hunters were letting federal agencies decide how to handle problem geese or killing problem geese and burying their carcasses.

If Michigan's resident goose population (i.e., geese nesting in Michigan) reaches levels requiring additional measures to control their numbers, wildlife managers may need to consider using hunting practices which are currently illegal to reduce their numbers (e.g., using unplugged guns and electronic calls). Goose hunters were asked whether they approved using additional methods for controlling resident Canada geese in Michigan. At least 50% of the goose hunters approved of hunting with unplugged guns (56 ± 2%), extending the hunting season to include late August (72 ± 2%), and hunting geese until 30 minutes after sunset (78 ± 2%). Less than 50% of the goose hunters approved of using electronic calls while hunting geese (46 ± 2% approval).

DISCUSSION

Since 1954, the highest numbers of duck and goose hunters recorded in Michigan occurred in 1970 (Figure 5). From this peak, the current number of people hunting ducks has declined 69% (average annual decline = 4.0%), while the number of people hunting geese has declined 46% (average annual decline = 2.1%). Declining numbers of small game hunters, including waterfowl hunters, has been noted previously in Michigan and throughout the United States since the mid-1970s (Enck et al. 2000, U.S. Department of the Interior 2002, Aiken 2004, Frawley 2006b). Many factors are responsible for declining waterfowl hunter numbers including loss of waterfowl habitat, increased urbanization of the human population, increased competition between hunting and other leisure activities, and decreased access to

private land for hunting. Although the number of duck hunters and duck harvest has decreased since 1970, duck harvest per day of hunting effort has increased (Figure 6). Goose harvest and the mean number of geese taken per day of hunting effort also have increased gradually since the 1970s (Figure 6).

Compared to 2004 (Frawley 2006a), an increased proportion of duck hunters in 2005 were satisfied with the number of ducks seen (38 versus 33% satisfied), although satisfaction was unchanged among duck hunters for the number of ducks harvested (25 versus 24% satisfied). Goose hunters reported increased satisfaction with the number of geese seen (54 versus 48% satisfied) and with their overall goose hunting experience (49 versus 43%). However, satisfaction with the number of geese harvested changed little (31 versus 28%) among goose hunters between 2004 and 2005.

The proportion of duck hunters that normally used spinning-wing decoys increased from 13% to 24% between 2001 and 2005 (Figure 7). The popularity of motorized spinning-wing decoys increased in Michigan because these decoys can be strong attractants to ducks and can increase harvest of ducks over traditional hunting methods (Caswell and Caswell 2004, Szymanski and Afton 2005). As these decoys have become more popular, the proportion of duck hunters disapproving of their use has declined. The proportion of duck hunters that disapproved of using spinning-wing decoys has decreased from 21% to 17% between 2001 and 2005 (Figure 8). In addition, the proportion of duck hunters that believe using spinning-wing decoys is an unethical hunting method has decreased from 16% to 13% between 2001 and 2005 (Figure 9).

In 2005, most duck hunters (66%) that preferred to hunt in the North Zone favored a hunting season beginning in the latter half of September (Figure 3). Similarly, 47% of duck hunters that preferred to hunt in the North Zone during the 2002-03 season favored a beginning date around October 1 (Frawley and Soulliere 2005).

Among duck hunters that preferred to hunt in the Middle Zone in 2005, 56% preferred a season beginning during late September or early October. Among duck hunters that preferred to hunt in the Middle Zone during the 2002-03 duck hunting season, 33% selected an opening date around October 1 with a 60-day season (Frawley and Soulliere 2005).

For the duck hunters that preferred to hunt in the South Zone in 2005, the most frequently selected preferred start dates (56%) for the season were early to mid-October. Previous surveys have reported similar results. Following the 1997-98 duck hunting season, duck hunters in the South Zone indicated any date among the Saturday closest October 1, first Saturday in October, and second Saturday in October was equally acceptable for the start date of the duck season (Frawley 2002). Following the 1998-99 duck hunting season, the largest proportion of duck hunters (27%) indicated any date among September 25, October 1, 5, 10, or 15 was equally acceptable for the start date of the duck season (Soulliere and Frawley 2001). Following the 2002-03 duck season, duck hunters most frequently selected (49%) early October as their preferred start date for a 60-day duck season (Frawley and Soulliere 2005).

The number of Canada geese that nest or reside predominantly within Michigan (resident Canada geese) has increased during the last 25 years and has led to increased conflicts

between these geese and people. If this resident goose population grows too large, alternative strategies to manage resident Canada goose populations in Michigan will be needed. Goose hunters have been asked periodically their opinion on the use of various hunting practices which are currently illegal (e.g., using unplugged guns and electronic calls) to help control goose numbers. In both 2002 and 2005, most goose hunters approved of hunting with unplugged guns, extending the hunting season to include late August, and hunting geese until 30 minutes after sunset (Figure 10). Less than 50% of the goose hunters approved of using electronic calls while hunting geese in both 2002 and 2005.

Goose hunters also have been asked periodically their opinion on the use of various techniques to control goose numbers in urban areas where human-goose conflict was a problem and hunting was not possible. In these situations, most goose hunters ($\geq$57%) have consistently supported killing adult geese and donating the meat to families in need as an option for reducing goose numbers (Figure 11). Goose hunters have been less supportive of the destroying the goose nests in areas with problem geese; however, the level of support has increased since 1998 (Figure 12). Most goose hunters ($\geq$64%) have consistently disapproved of controlling goose populations using dietary supplements that could reduce their reproduction (Figure 13).

ACKNOWLEDGEMENTS

I thank all the hunters that provided information. Jaclyn Mapes, Theresa Riebow, and Becky Walker completed data entry. Marshall Strong created Figure 1. Mike Bailey, Cheryl Fliearman, Jennifer Kleitch, Faye McNew, Doug Reeves, and William Moritz reviewed a draft version of this report.

LITERATURE CITED

Aiken, R. 2004. Fishing and hunting 1991-2001: avid, casual, and intermediate participation trends. Report 2001-5. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C., USA.

Caswell, J. H. and F. D. Caswell. 2004. Vulnerability of mallards to hunting with spinning-wing decoy in Manitoba. Wildlife Society Bulletin 32:1297-1304.

Cochran, W. G. 1977. Sampling techniques. John Wiley & Sons, New York. USA.

Enck, J. W., D. J. Decker, and T. L. Brown. 2000. Status of hunter recruitment and retention in the United States. Wildlife Society Bulletin 28:817-824.

Frawley, B. J. 2002. 1997-2001 Michigan small game harvest survey. Wildlife Division Report 3377. Michigan Department of Natural Resources, Lansing, USA.

Frawley, B. J., and G. J. Soulliere. 2005. Michigan waterfowl hunter activity and opinions on regulations, management, and satisfaction following the 2002-03 hunting seasons. Wildlife Division Report 3443. Michigan Department of Natural Resources, Lansing, USA.

Frawley, B. J. 2006a. 2004 waterfowl harvest survey. Wildlife Division Report 3456. Michigan Department of Natural Resources, Lansing, USA.

Frawley, B. J. 2006b. Demographics, recruitment, and retention of Michigan hunters: 2005 update. Wildlife Division Report 3462. Michigan Department of Natural Resources, Lansing, USA.

Payton, M. E., M. H. Greenstone, and N. Schenker. 2003. Overlapping confidence intervals or standard error intervals: what do they mean in terms of statistical significance? Journal of Insect Science 3:34.

Soulliere, G. J. and Frawley, B. J. 2001. Michigan waterfowl hunter activity and opinions on regulations, management, and satisfaction, 1998-1999. Wildlife Division Report 3357. Michigan Department of Natural Resources, Lansing, USA.

Szymanski, M L and A. D. Afton. 2005. Effects of spinning-wing decoys on flock behavior and hunting vulnerability of mallards in Minnesota. Wildlife Society Bulletin 33:993-1001.

U.S. Department of the Interior. 2002. 2001 National survey of fishing, hunting, and wildlife-associated recreation. U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, Bureau of the Census, Washington, D.C., USA.

U.S. Fish and Wildlife Service. 2005. Migratory bird harvest information, 2004: preliminary estimates. U.S. Department of the Interior, Washington, D.C., USA.

Table 1. Waterfowl hunting seasons in Michigan, 2005-2006.

Species, season, and area[a]	Season dates
Ducks[b]	
North Zone (UP)	Oct. 1 – Nov. 29
Middle Zone	Oct. 1 – Oct. 9 and Oct. 22 – Dec. 11
South Zone	Oct. 15 – Dec. 11 and Dec. 31 – Jan. 1
Canada geese[b,c]	
Early seasons	
Upper Peninsula	Sept. 1 – 10
Lower Peninsula	Sept. 1 – 15
Regular seasons	
Upper Peninsula	Sept. 24 – Oct. 21
Lower Peninsula	Oct. 1 – 16 and Nov. 24 – Dec. 5
Late season	
Southern Lower Peninsula	Dec. 31 – Jan. 29

[a]See Figure 1 for boundaries of hunt areas.
[b]Ducks and geese could also be taken during a special 2-day Youth Season (September 17-18).
[c]Special goose hunting seasons also occurred on Goose Management Units, but these seasons affected a relatively small area.

Table 2. Number of waterfowl hunting licenses sold in Michigan, 2001-2005.

Item	Year					2004-2005 % Change
	2001	2002	2003	2004	2005	
Number of licenses sold[a]	66,472	65,050	65,457	63,320	60,234	-4.9
Number of people buying a hunting license[b,c]	65,966	64,582	65,024	62,738	59,658	-4.9

[a]The number of licenses sold is higher than the number of people buying licenses because some people purchased multiple licenses.
[b]A person was counted only once, regardless of how many licenses they purchased.
[c]Hunters 12-15 years of age could legally hunt waterfowl without a waterfowl hunting license.

Table 3. Estimated number, sex, and age of waterfowl hunters in Michigan, 2001-2005.[a]

Hunters	2001	2002	2003	2004	2005	
					Estimate	95% CL
Waterfowl[b]	63,966	58,944	60,805	58,422	50,431	1,032*
Males (%)	98.0	97.8	97.5	98.2	96.4%	0.6*
Females (%)	2.0	2.2	2.5	1.8	3.6%	0.6*
Age (Years)	38.3	39.2	39.7	39.6	39.3	0.4

[a]Analyses included only those people that hunted.
[b]People that hunted ducks or geese.
*Non-overlapping 95% confidence intervals indicated estimates differed significantly between years (P<0.005).

Table 4. Estimated number of waterfowl hunters by season and region in Michigan, 2002-2005.[a]

Species and area (stratum)	2002	2003	2004	2005 No.	2005 95% CL	2004-2005 % Change
Ducks (First split)						
UP	6,644	7,295	7,987	6,654	657	-17
NLP	19,126	19,086	19,788	16,218	951	-18*
SLP	27,152	28,278	27,831	22,704	1,067	-18*
Statewide	47,277	48,992	48,881	40,525	1,132	-17*
Ducks (Second split)						
UP						
NLP	2,119	2,357	1,652	6,399	641	287*
SLP	8,927	9,777	8,011	9,628	769	20*
Statewide	10,916	12,096	9,618	15,421	941	60*
Ducks (Seasons combined)						
UP	6,661	7,308	8,142	6,696	657	-18*
NLP	19,566	19,553	20,364	17,883	982	-12*
SLP	28,303	29,755	29,494	24,218	1,083	-18*
Statewide	48,383	50,455	50,330	42,660	1,122	-15*
Geese (Early season)						
UP	1,964	2,600	2,484	2,013	376	-19
NLP	7,756	7,558	7,865	7,875	717	0
SLP	17,219	16,088	15,844	13,603	892	-14*
Statewide	26,123	25,474	25,216	22,944	1,071	-9*
Geese (Regular season)						
UP	3,381	4,859	4,019	3,643	495	-9
NLP	8,277	10,775	9,694	9,448	764	-3
SLP	13,442	15,895	16,246	13,223	879	-19*
Statewide	24,206	30,171	28,815	25,207	1,090	-13*
Geese (Late season)						
UP						
NLP	984	1,043	605	1,057	273	75
SLP	9,682	9,408	8,141	8,313	721	2
Statewide	10,526	10,373	8,687	9,192	769	6
Geese (Seasons combined)						
UP	4,185	5,734	5,255	4,334	536	-18
NLP	12,094	13,988	13,357	12,809	871	-4
SLP	24,634	25,331	25,235	20,395	1,022	-19*
Statewide	38,214	42,024	40,394	34,726	1,140	-14*

[a]The number of hunters does not add up to the statewide total because hunters can hunt in more than one region.
*Non-overlapping 95% confidence intervals indicated estimates differed significantly (P<0.005).

Table 5. Estimated amount of waterfowl hunter effort (days afield) by season and region, 2002-2005.

Species and area (stratum)	2002	2003	2004	2005 No.	2005 95% CL	2004-2005 % Change
Ducks (First split)						
UP	38,871	49,500	50,977	40,274	6,414	-21
NLP	119,508	125,430	140,167	109,941	14,791	-22*
SLP	168,292	184,763	198,688	178,186	18,524	-10
Statewide	326,671	359,693	389,831	328,401	24,444	-16*
Ducks (Second split)						
UP						
NLP	3,397	3,802	2,591	30,569	6,961	1080*
SLP	13,397	14,708	12,577	25,848	3,622	106*
Statewide	16,794	18,510	15,167	56,417	8,161	272*
Ducks (Seasons combined)						
UP	38,878	49,517	51,001	46,809	7,116	-8
NLP	122,913	129,249	142,793	114,904	9,818	-20*
SLP	181,674	199,437	211,204	178,029	12,180	-16*
Statewide	343,465	378,203	404,998	339,741	16,116	-16*
Geese (Early season)						
UP	7,898	9,933	9,014	4,817	1,520	-47*
NLP	31,276	28,020	31,670	32,138	5,150	1
SLP	70,166	64,401	63,975	54,435	7,404	-15
Statewide	109,340	102,355	104,659	91,390	9,014	-13
Geese (Regular season)						
UP	14,813	30,456	21,899	10,178	2,675	-54*
NLP	40,607	52,377	48,667	27,524	4,555	-43*
SLP	53,929	69,092	72,173	40,177	5,660	-44*
Statewide	109,348	151,925	142,739	77,880	7,849	-45*
Geese (Late season)						
UP						
NLP	3,276	2,794	2,975	2,170	990	-27
SLP	36,439	34,390	31,215	22,395	4,561	-28
Statewide	39,715	37,184	34,190	24,566	4,732	-28
Geese (Seasons combined)						
UP	22,801	40,390	30,726	28,187	4,903	-8
NLP	75,374	83,185	83,132	78,818	8,164	-5
SLP	160,228	167,890	167,731	148,934	11,909	-11
Statewide	258,403	291,464	281,588	255,938	14,708	-9

*Non-overlapping 95% confidence intervals indicated estimates differed significantly (P<0.005).

Table 6. Estimated waterfowl harvest by season and region in Michigan, 2002-2005.

Species and area (stratum)	2002	2003	2004	2005 No.	2005 95% CL	2004-2005 % Change
Ducks (First split)						
UP	61,573	55,296	44,098	46,678	7,116	6
NLP	149,864	163,060	137,856	84,778	7,703	-39*
SLP	191,924	210,061	190,955	161,176	11,508	-16
Statewide	403,361	428,417	372,908	292,632	14,672	-22*
Ducks (Second split)						
UP						
NLP	5,472	5,772	3,415	30,417	5,023	791*
SLP	19,684	19,210	19,121	16,693	1,771	-13
Statewide	25,156	24,982	22,536	47,110	5,479	109*
Ducks (Seasons combined)						
UP	61,549	55,336	44,182	40,321	6,414	-9
NLP	155,312	168,879	141,426	140,431	17,103	-1
SLP	211,656	229,185	209,837	204,067	20,137	-3
Statewide	428,516	453,399	395,444	384,819	27,086	-3
Geese (Early season)						
UP	7,942	10,444	6,347	6,548	1,476	3
NLP	26,366	22,619	23,587	30,532	3,432	29
SLP	60,208	59,135	57,237	55,699	4,811	-3
Statewide	94,516	92,198	87,171	92,779	5,803	6
Geese (Regular season)						
UP	8,090	23,667	9,264	21,676	4,148	134*
NLP	19,270	24,658	21,950	45,223	5,217	106*
SLP	28,164	34,034	35,710	59,751	5,664	67*
Statewide	55,524	82,359	66,924	126,650	8,455	89*
Geese (Late season)						
UP						
NLP	1,945	2,246	2,510	3,012	1,318	20
SLP	23,399	26,497	17,663	33,497	4,316	90*
Statewide	25,344	28,743	20,174	36,509	4,619	81*
Geese (Seasons combined)						
UP	16,072	34,137	15,477	14,893	3,455	-4
NLP	47,683	49,522	47,877	61,827	9,040	29
SLP	111,629	119,641	110,915	117,115	14,572	6
Statewide	175,384	203,300	174,269	193,836	17,749	11

*Non-overlapping 95% confidence intervals indicated estimates differed significantly (P<0.005).

Table 7. Estimated number of duck hunters, hunting effort, and ducks harvested by season and management zone in Michigan, 2005.

	Hunters		Effort		Harvest	
Season and zone	No.	95% CL	No.	95% CL	No.	95% CL
First split						
North[a]	6,697	664	39,980	6,425	46,481	7,128
Middle	10,127	795	37,214	4,656	34,570	3,284
South	28,763	1,129	251,207	22,961	211,581	13,078
Statewide	40,525	1,132	328,401	24,444	292,632	14,672
Second split						
North[a]	0	0	0	0	0	0
Middle	5,207	590	28,425	7,315	30,029	5,278
South	10,852	812	27,992	3,494	17,081	1,387
Statewide	15,421	941	56,417	8,161	47,110	5,479
Seasons combined						
North[a]	6,740	664	40,086	6,425	46,638	7,128
Middle	11,781	846	65,299	9,754	64,085	7,127
South	30,346	1,135	279,434	24,311	229,018	13,644
Statewide	42,660	1,122	384,819	27,086	339,741	16,116

[a]Estimates for the North Zone do not equal estimates for the UP in Tables 5 and 6 because hunting effort and birds harvested from unknown locations were allocated among areas in proportion to the known effort and harvest.

*Non-overlapping 95% confidence intervals indicated estimates differed significantly (P<0.005).

Table 8. Estimated number of waterfowl hunters, hunting effort, and waterfowl harvested on Managed Waterfowl Hunt Areas in Michigan, 2005.[a]

	Hunters		Effort		Harvest	
Species	No.	95% CL	No.	95% CL	No.	95% CL
Ducks	8,560	756	45,663	6,145	60,134	10,369
Geese	5,556	625	28,788	4,901	11,063	2,871
Ducks and geese combined	9,792	801	74,451	9,985	71,198	11,248

[a]The Managed Waterfowl Hunt Areas consisted of Allegan Highbanks, Fennville Farm, Fish Point, Muskegon County Wastewater, Nayanquing Point, Pointe Mouillee, Shiawassee Federal Refuge, Shiawassee State Game Area, and St. Clair Flats (Harsens Island).

Table 9. Level of satisfaction among waterfowl hunters with the 2005 waterfowl hunting seasons and hunting regulations in Michigan (summarized as the proportion of active waterfowl hunters reporting various levels of satisfaction).[a]

	Level of satisfaction							
	Very satisfied or somewhat satisfied		Neutral		Somewhat dissatisfied or strongly dissatisfied		No answer	
Hunting experience or regulation	%	95% CL	%	95% CL	%	95% CL	%	95% CL
Ducks seen	38	2	18	2	39	2	5	1
Ducks harvested	25	2	21	2	49	2	5	1
Geese seen	54	2	17	2	23	2	6	1
Geese harvested	31	2	22	2	41	2	6	1
Duck hunting experience	50	2	19	2	25	2	6	1
Goose hunting experience	49	2	21	2	23	2	7	1
Duck season dates	42	2	25	2	26	2	7	1
Length of duck season	48	2	26	2	21	2	6	1
Daily duck limit	54	2	28	2	12	1	6	1

[a]Estimates associated with duck hunting were derived from answers provided by people that had hunted ducks, while estimates associated with goose hunting were derived from answers received from people that had hunted geese.

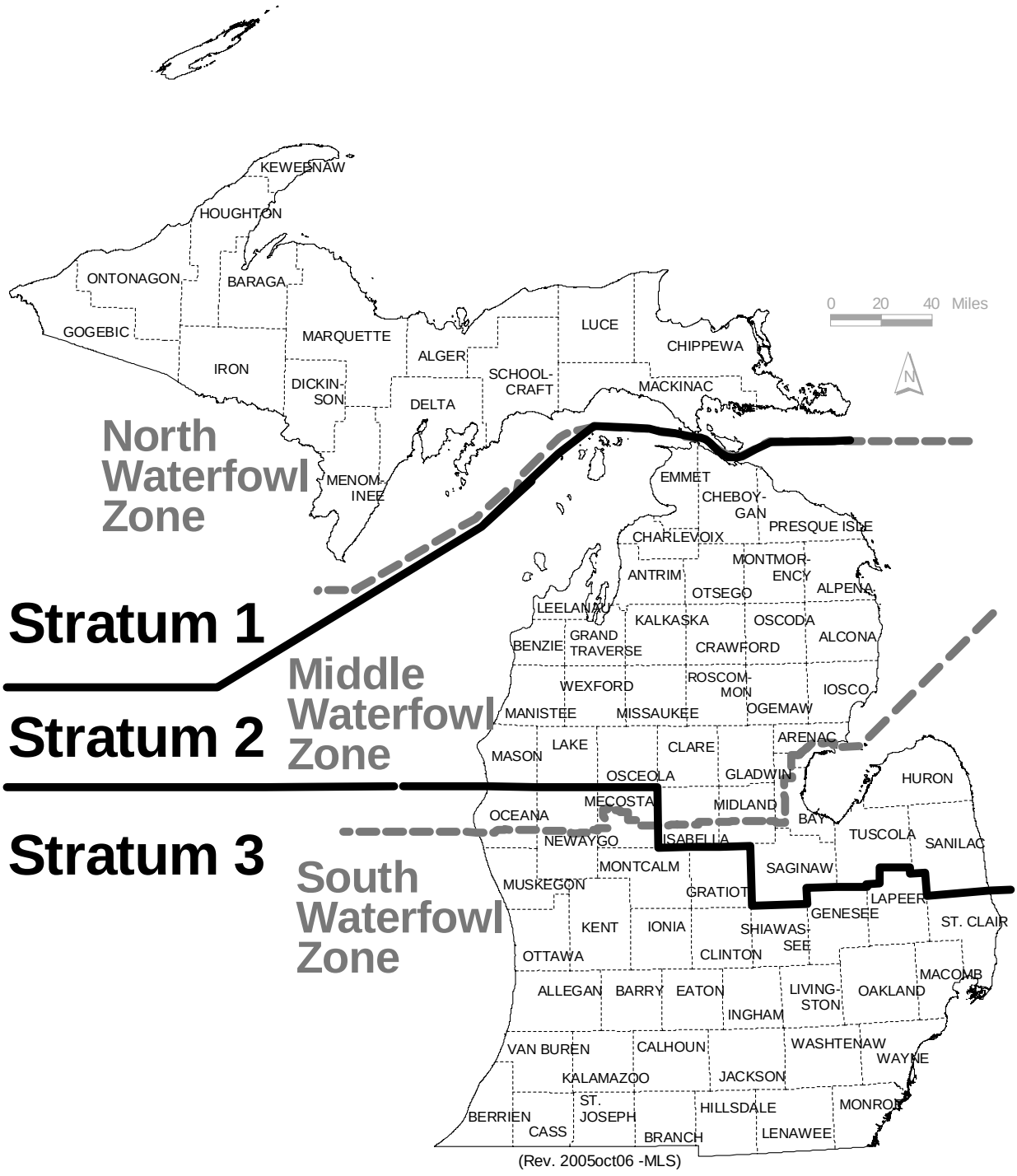

Figure 1. Areas (strata) used to summarize the waterfowl survey data for the 2005 waterfowl hunting seasons in Michigan. Stratum boundaries did not match the waterfowl management hunting zones.

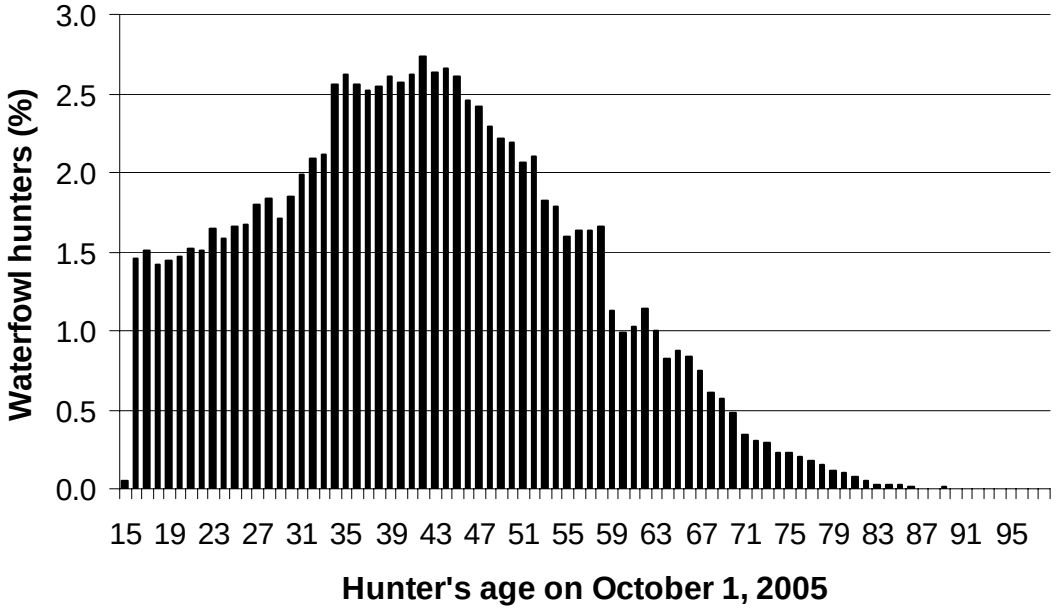

Figure 2. Age of people that purchased a waterfowl hunting license in Michigan for the 2005 hunting seasons ($\bar{x}$ = 42 years). Hunters 12-15 years of age could legally hunt waterfowl without a waterfowl hunting license.

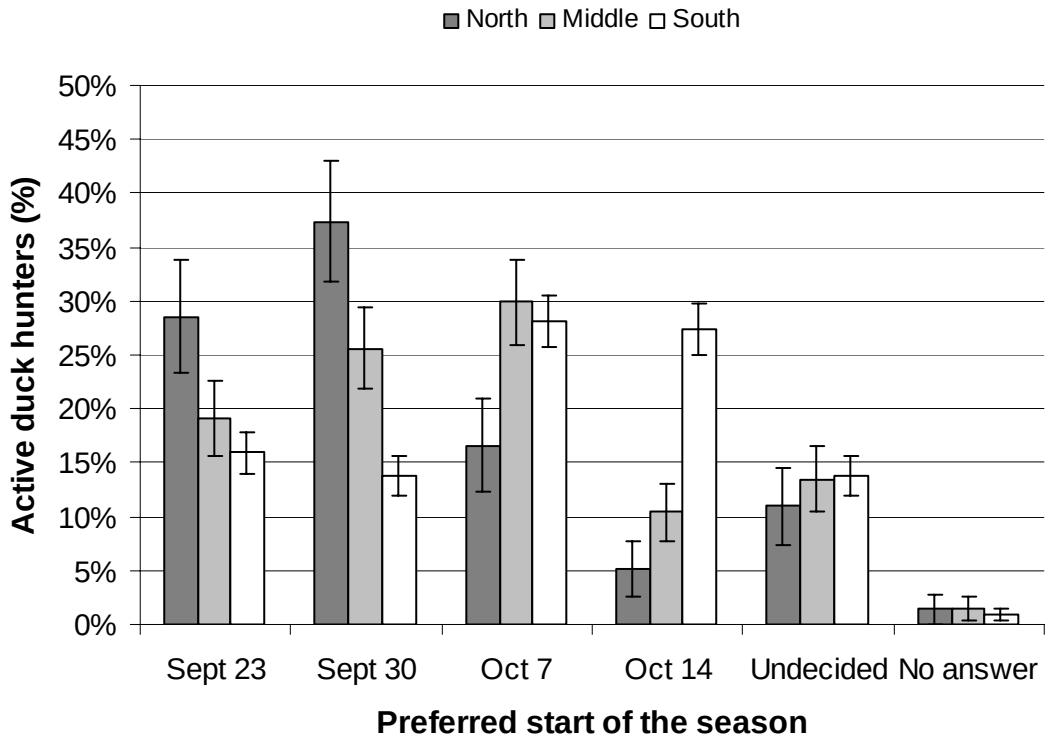

Figure 3. Preferred start of the duck hunting season in Michigan, summarized by duck management zone. Estimates associated with each zone were derived from answers provided by people that preferred to hunt in that zone.

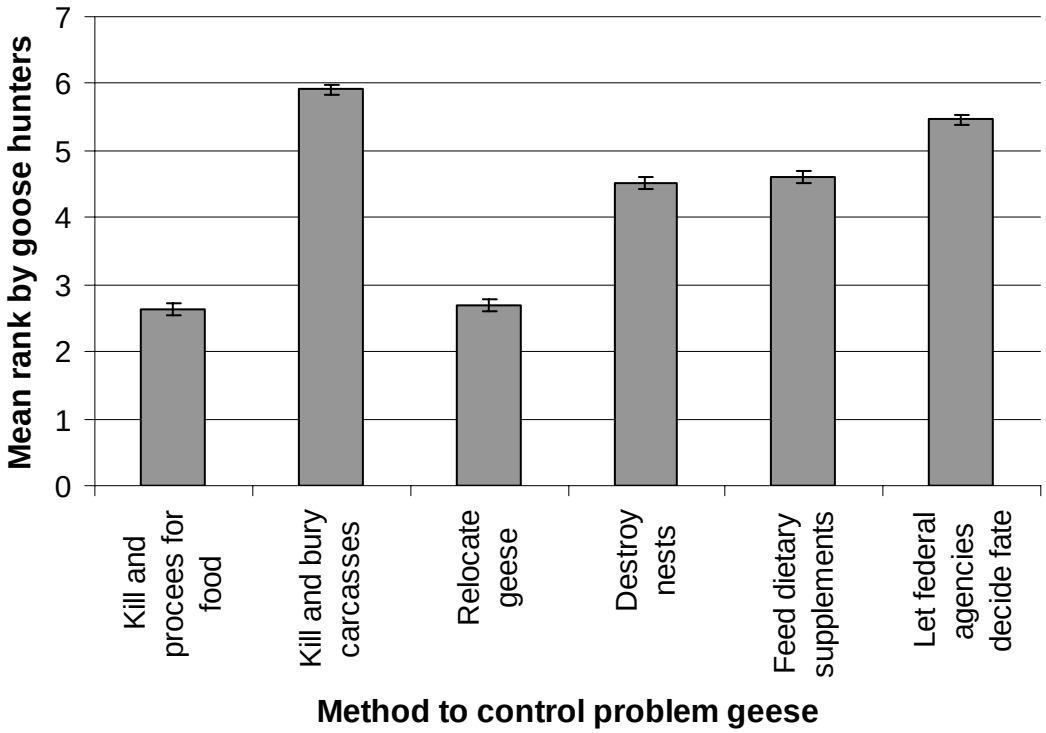

Figure 4. The mean goose hunter ranking of various methods for handling geese where hunting has not been effective in controlling conflicts between geese and people in Michigan. Each method was assigned a ranking from a value of one to seven (one being the most preferred and seven being the least preferred method).

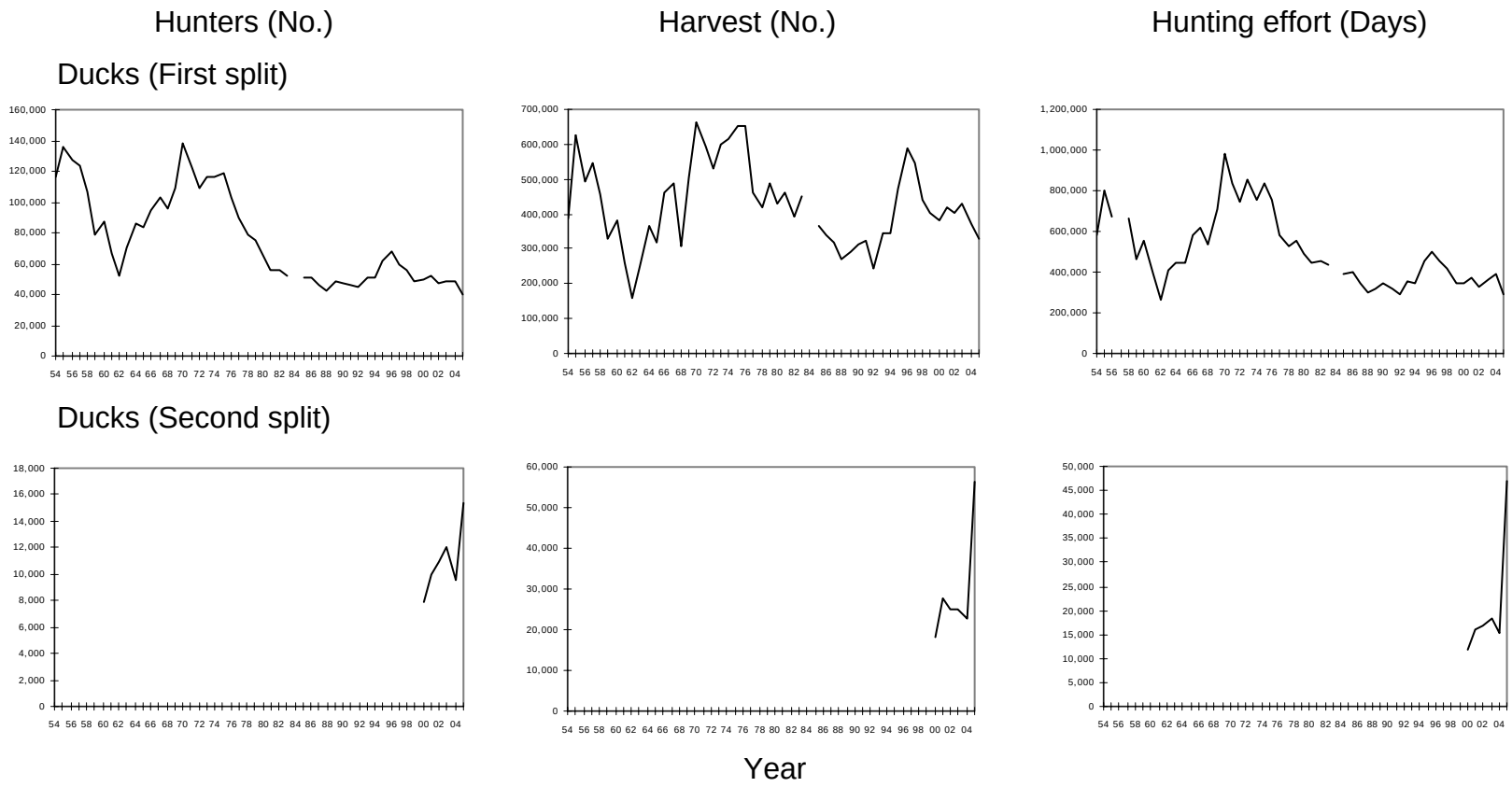

Figure 5. Estimated number of hunters, harvest, and hunting effort in Michigan during the waterfowl hunting seasons, 1954-2005. No estimates were available or no seasons existed during years when no data are plotted.

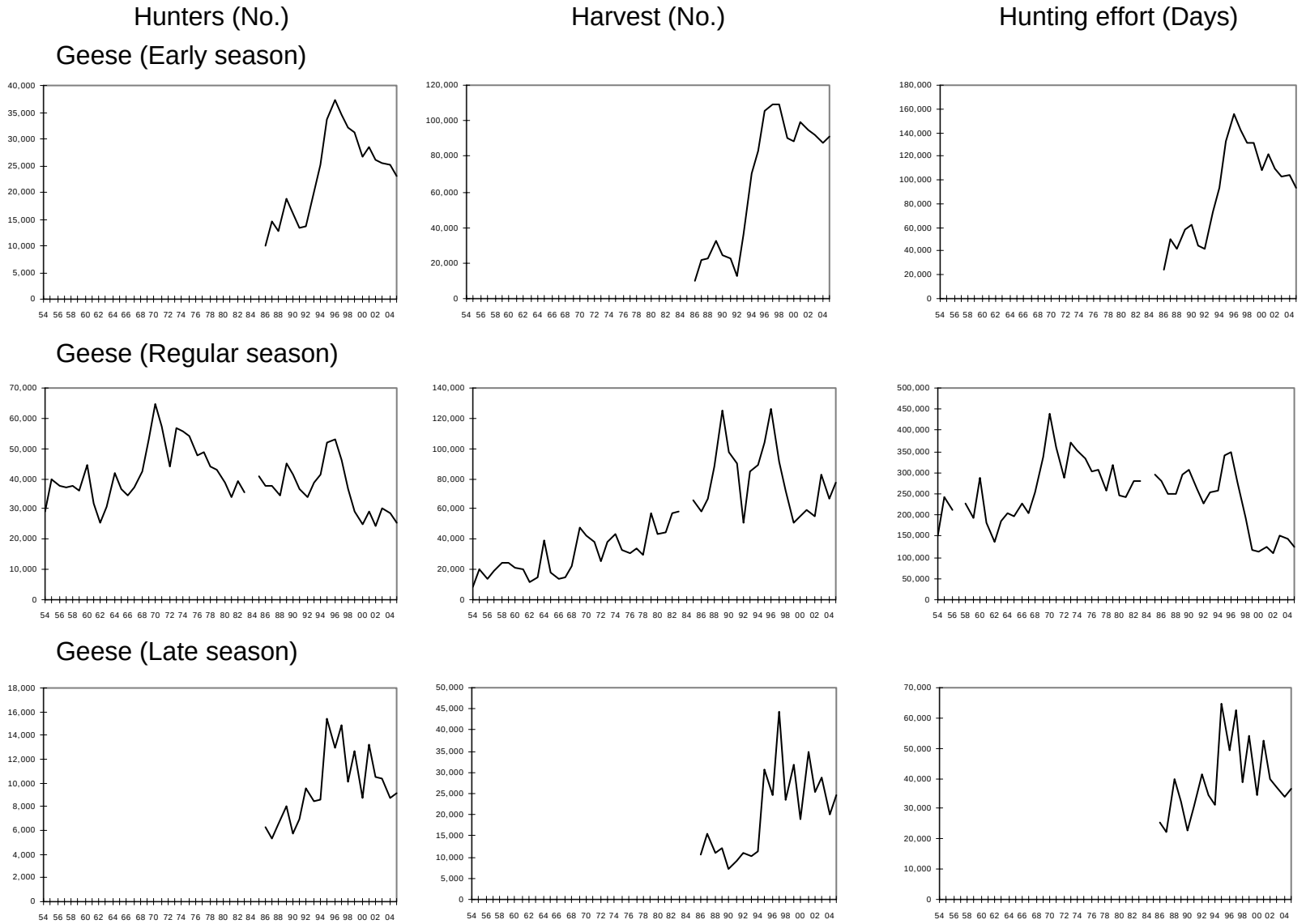

Figure 5 (continued). Estimated number of hunters, harvest, and hunting effort in Michigan during the waterfowl hunting seasons, 1954-2005. No estimates were available or no seasons existed during years when no data are plotted.

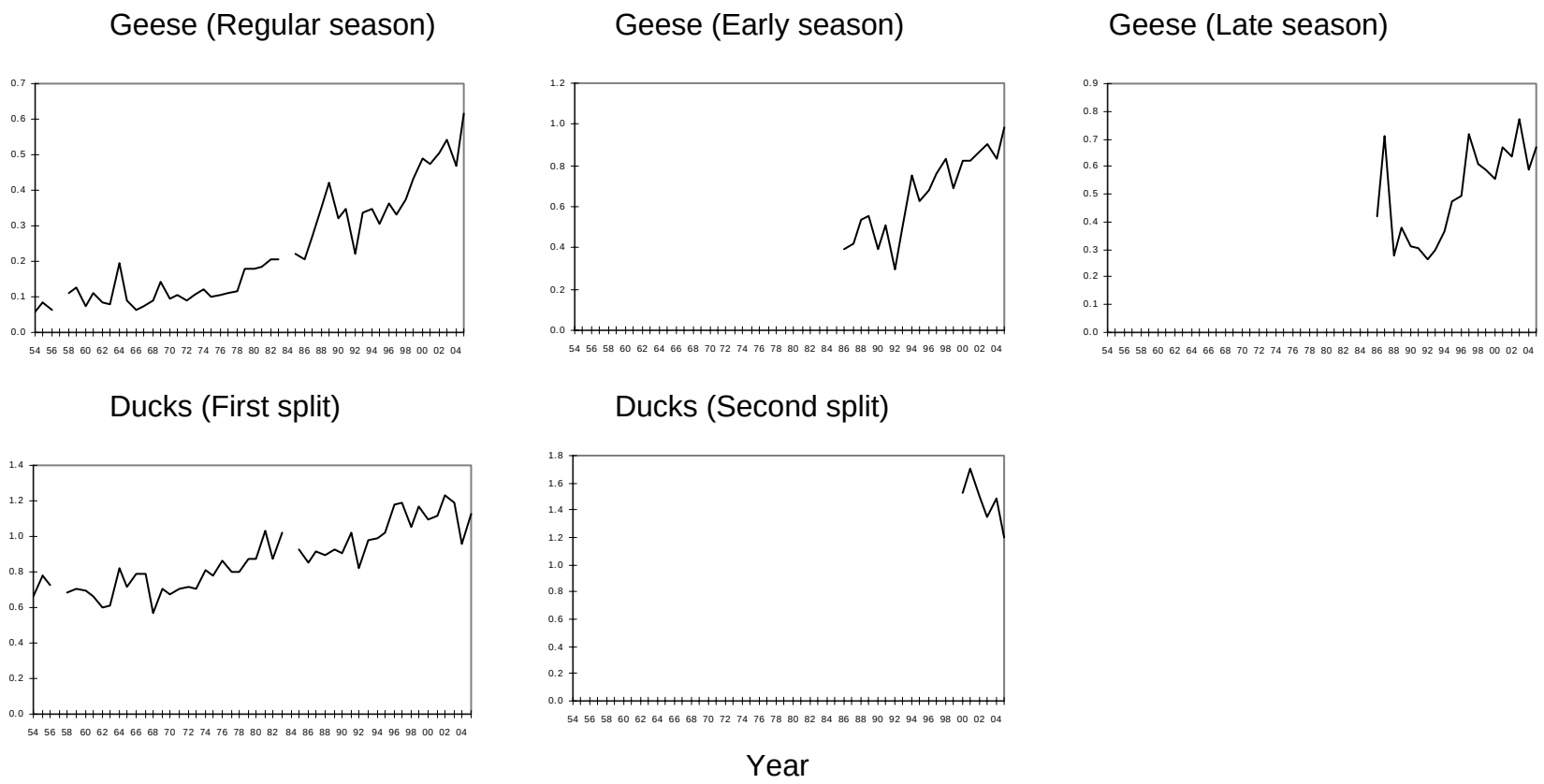

Figure 6. Estimated harvest per effort in Michigan during the waterfowl hunting seasons, 1954-2005. No estimates were available or no seasons existed during years when no data are plotted.

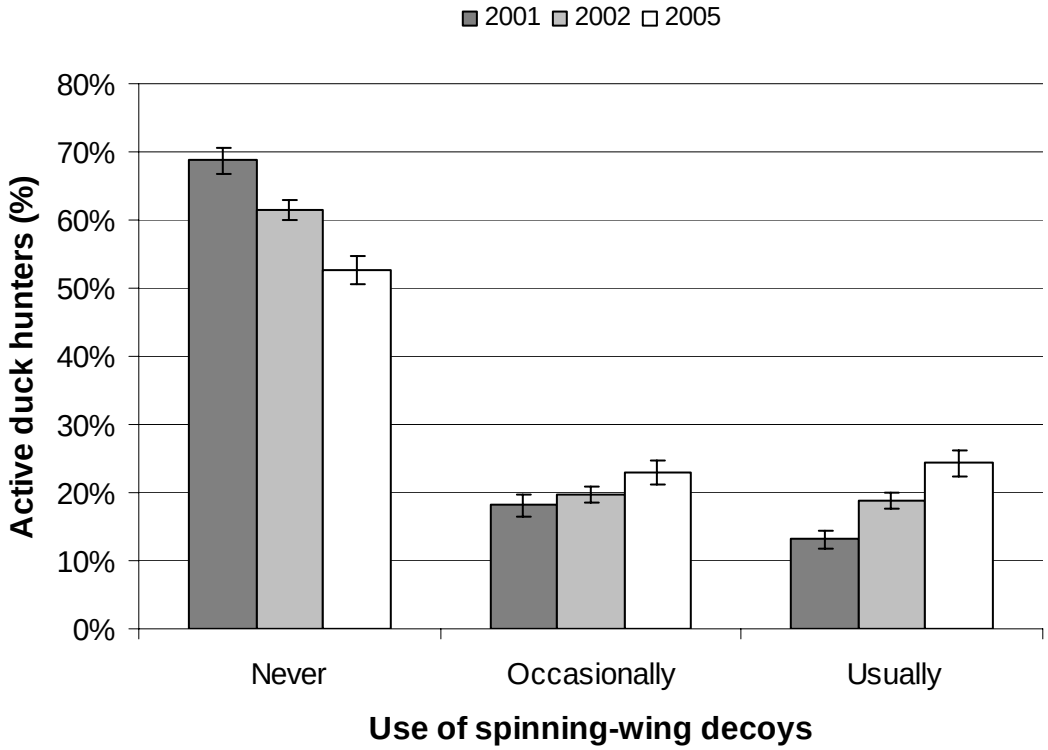

Figure 7. Proportion of Michigan duck hunters that used motorized spinning-wing decoys while duck hunting in Michigan, summarized by year.

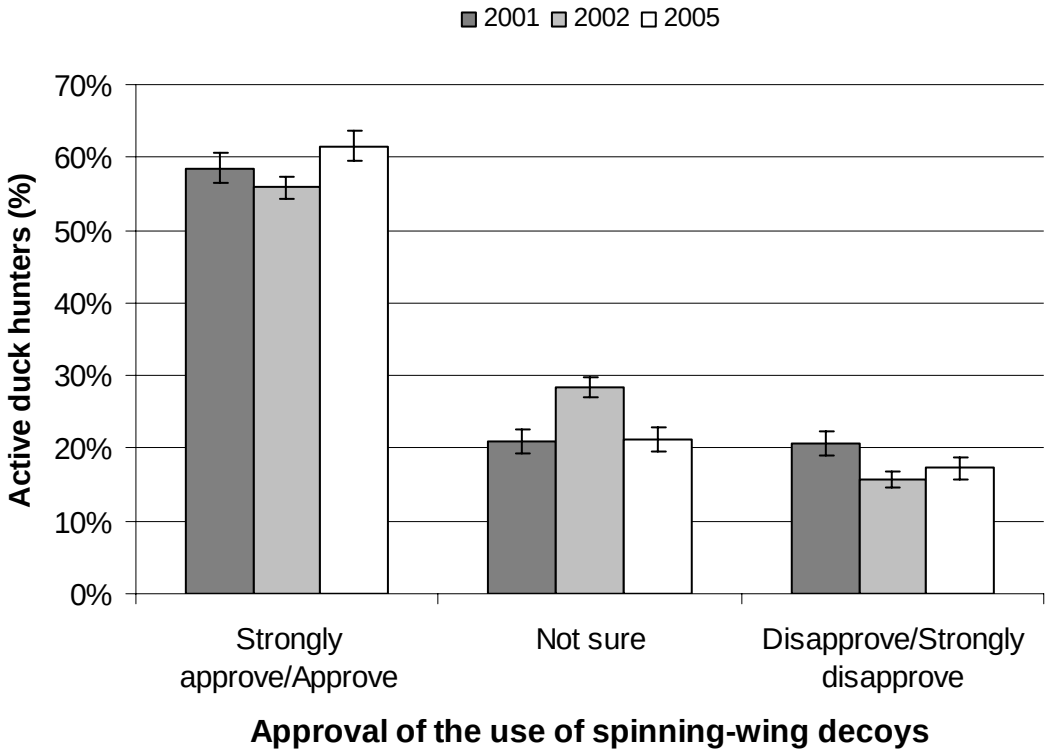

Figure 8. Proportion of Michigan duck hunters that approved of the use of motorized spinning-wing decoys while duck hunting in Michigan, summarized by year.

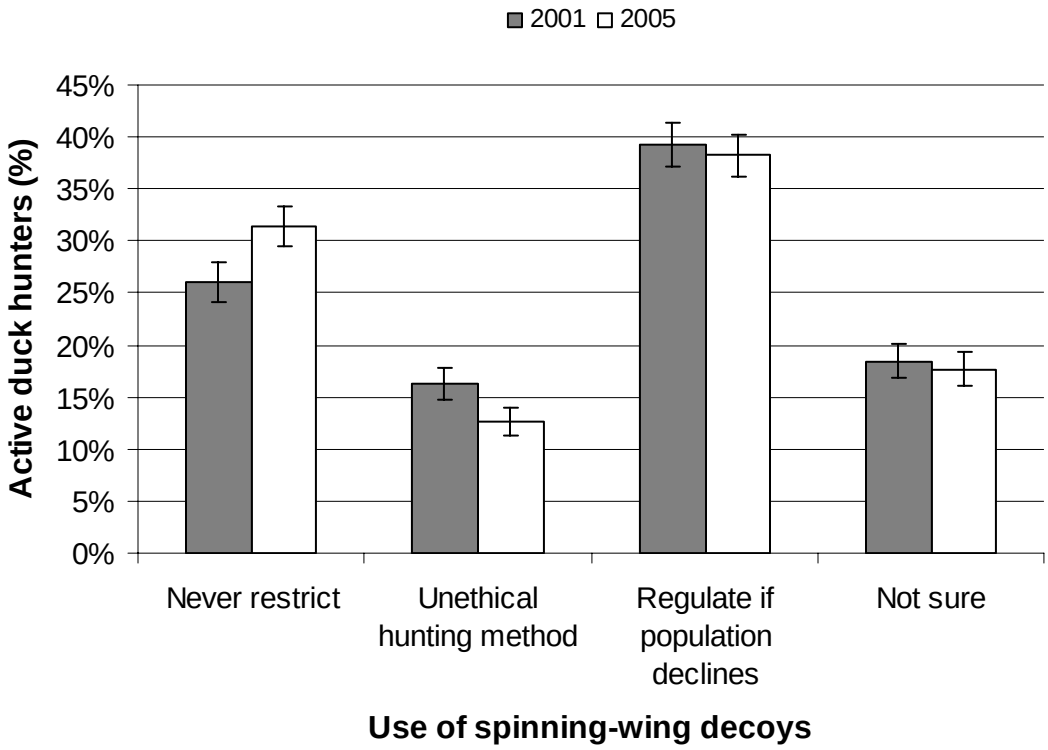

Figure 9. Opinions of Michigan duck hunters about the use of motorized spinning-wing decoys while duck hunting in Michigan, summarized as proportion of hunters expressing a specific view and by year.

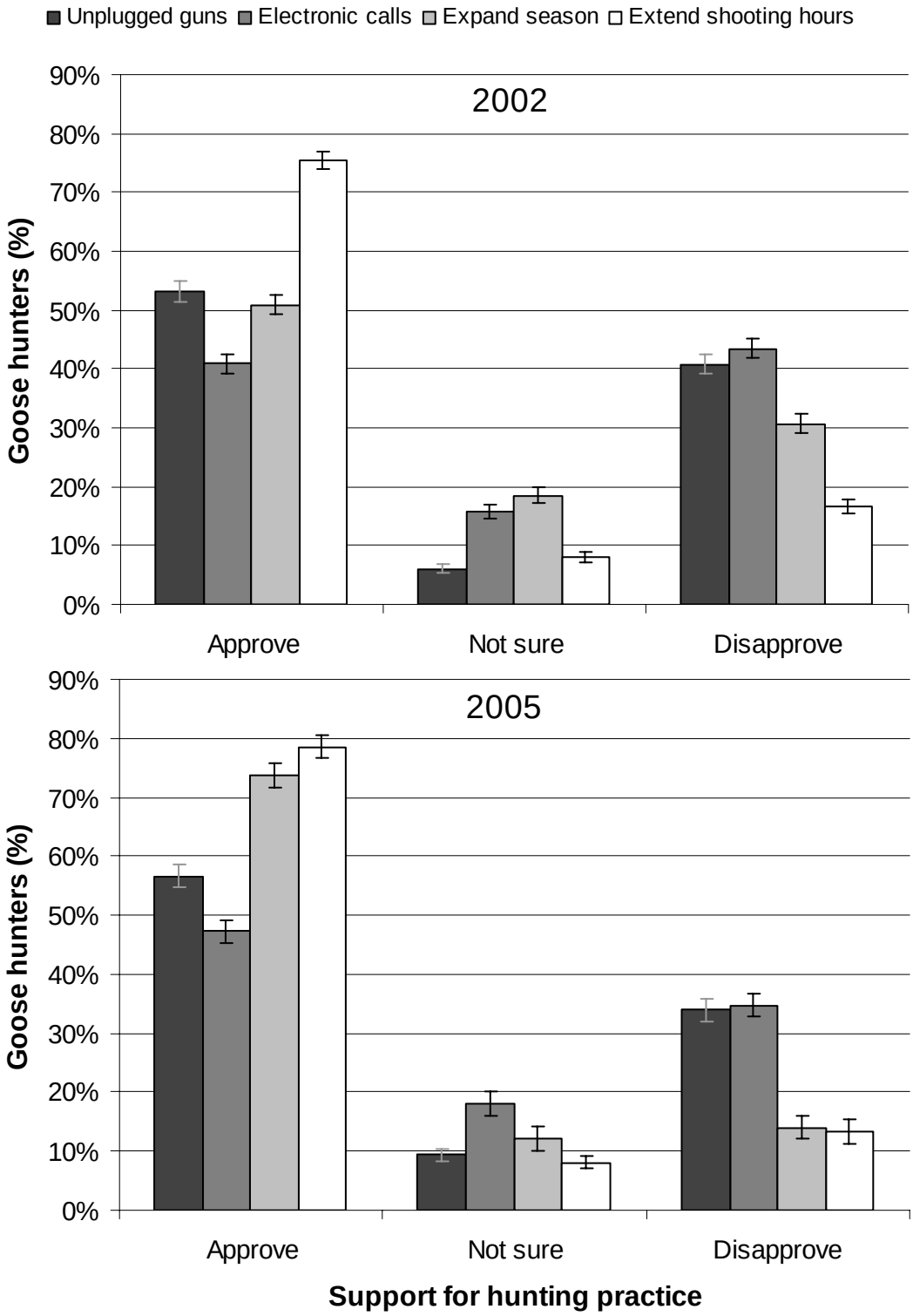

Figure 10. Proportion of goose hunters that supported additional hunting practices to increase harvest of resident geese in Michigan, summarized following the 2002 (top) and 2005 hunting seasons (bottom). Methods evaluated included hunting with unplugged guns, using electronic calls, expanding season into late August, and extending shooting time until one-half hour after sunset.

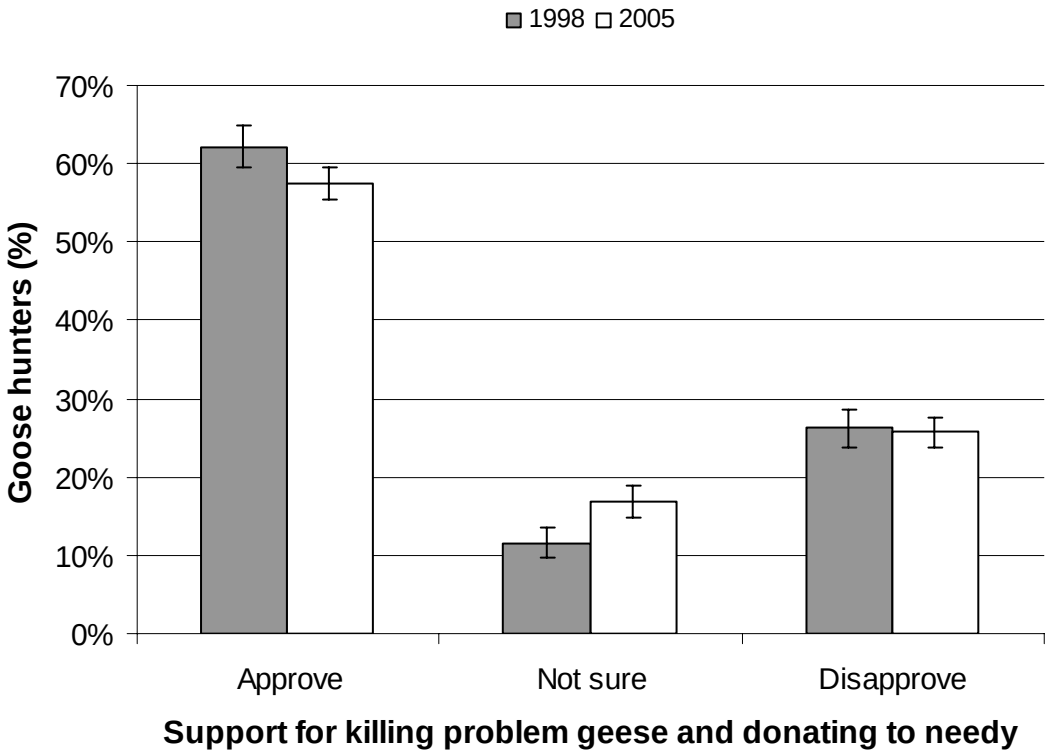

Figure 11. Proportion of goose hunters that supported killing adult geese in areas with problem geese and donating to families in need in Michigan, summarized by year.

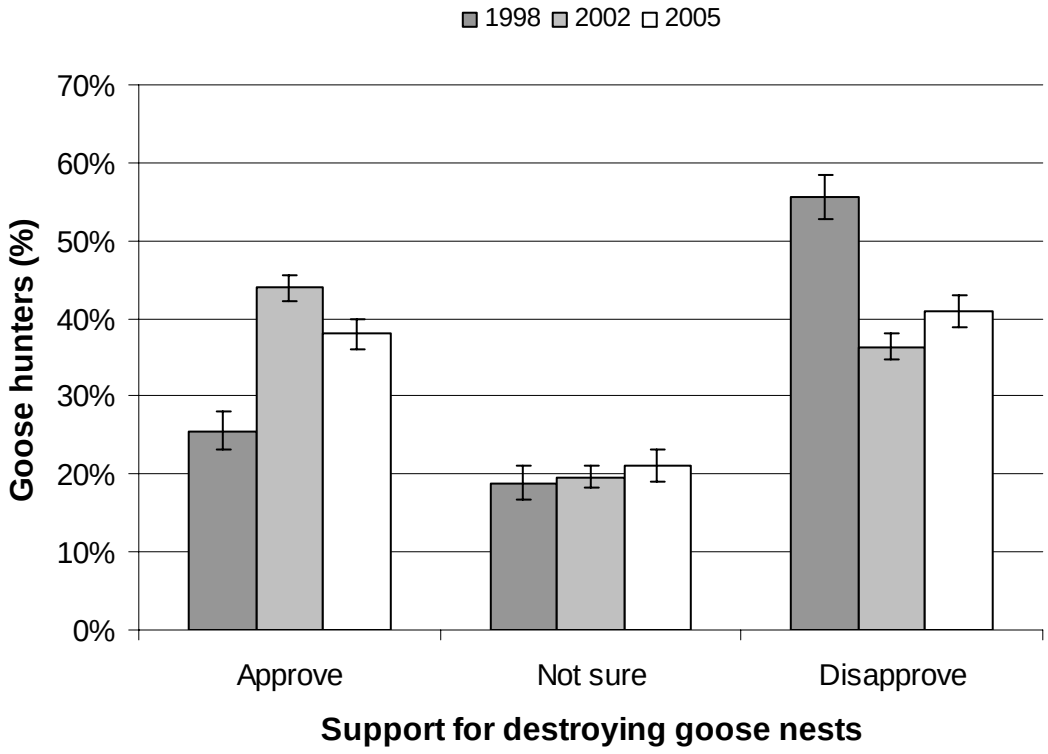

Figure 12. Proportion of goose hunters that supported destroying goose nests in areas with problem geese to lower their reproduction in Michigan, summarized by year.

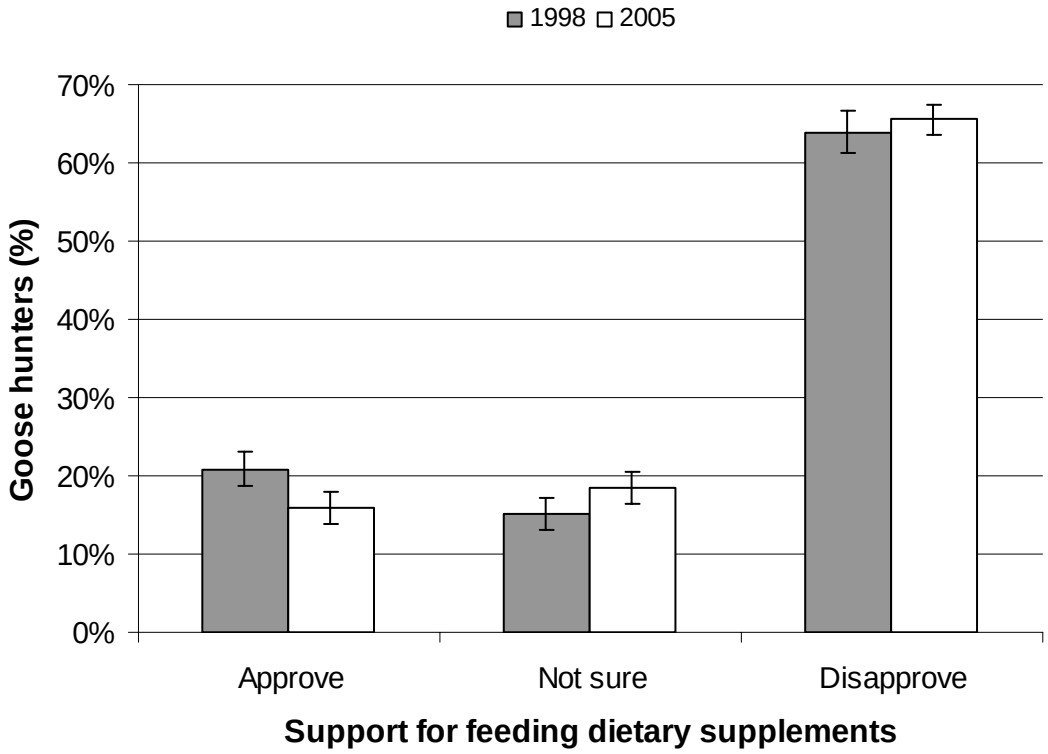

Figure 13. Proportion of goose hunters that supported feeding dietary supplements to geese in areas with problem geese to lower their reproduction in Michigan, summarized by year